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ABSTRACT

This paper examines the ways in which children's beliefs about their abilities influence their academic achievement. These beliefs interact with the demands of different tasks or learning situations. Research is described which deals with children's causal attributions for their academic success or failure and with children's definitions of intelligence. Research suggests that the impact of children's beliefs varies as a function of the particular learning situation. In addition, children's beliefs about their abilities are not simply mirror reflections of their actual abilities or previous performances. Several studies are described which examine children's effort, performance, and causal attributions of ability and intelligence in a variety of situations. Three sex differences emerged: (1) females exhibited less confidence in their ability to succeed in challenging tasks; (2) females exhibited less confidence in social studies and science tasks than in reading, language arts, and mathematics tasks which involve more feedback; and (3) females were likely to have decreasing mathematics confidence as they become older. Since some childhood beliefs are not adaptive, it is recommended that ways to encourage facilitative beliefs be found. (GDC)

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The Interaction Between Children's Achievement-Related Beliefs and the Characteristics of Different Tasks

by

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Paper presented as part of symposium entitled "Student Beliefs and School Achievement." Dale H. Schunk, Chair, and Phillip H. Winne, Discussant. Presented at the Annual Meeting of the American Educational Research Association, April 1987, Washington, D.C.

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The main theme of this paper is that to understand how children's beliefs about their abilities influence their academic achievements, it is important to examine how specific beliefs INTERACT with the demands of different tasks or learning situations. More specifically, while certain beliefs are generally adaptive and other beliefs are generally maladaptive, there is evidence that the adaptiveness of particular beliefs varies as a function of the learning situation. First, I will describe some studies that provide supportive evidence. Then I will explore how this "interactional" analysis might help explain some of the sex differences in achievement behaviors that emerge in the junior high and high school years. I will propose that the particular beliefs that girls are likely to hold about their abilities make them well suited to deal with the demands of certain academic areas, but ill suited for the demands of other areas--even though they may possess the intellectual abilities to succeed in both types of areas. Finally, I will offer some suggestions for future research and for educational practice.

It is important to note that I am not arguing for the central importance of any particular belief or type of belief. The research I will describe deals primarily with children's causal attributions (explanations) for their academic failures and successes, and with children's definitions of "intelligence." However, I am not arguing that these particular beliefs are of more central importance than other achievement-related beliefs, such as children's efficacy judgements, or the degree to which children's value intrinsic versus extrinsic reinforcements, etc. Rather, the crucial point is that the impact of particular

beliefs varies as a function of the particular learning situation. A secondary point (that also seems to run through the other papers in this symposium) is that children's beliefs about their abilities are not simply mirror reflections of their actual abilities or previous performances.

In the first study (Licht & Dweck, 1984), we examined how children's causal attributions for academic failures interact with whether they confront confusion at the start of a new lesson. Previous research suggested that the belief that one's failures are due to insufficient effort should lead children to increase their efforts when they confront difficulty. In contrast, the belief that one's failures are due to factors that are beyond their control should result in poorer performance. After all, why try hard if overcoming failure is beyond your control.

In the Licht & Dweck (1984) study, we simulated two types of classroom learning. In both learning conditions, children were presented with new academic material to master (i.e., some basic principles of operant conditioning). The material was identical in both conditions; and it was presented in the same format. It was presented in an illustrated booklet with multiple-choice questions at the end of each section. The only thing that differentiated the two conditions was what occurred at the very beginning of the booklets. For children in the "confusion" condition, there were two confusing passages (about 1/2 page each) at the start of the booklet. In the "no-confusion" condition, these two introductory passages were written so as to

NOT be confusing. A point which should be underscored here is that while the confusing passages were part of the same booklet, the confusing material (which dealt with imitation) was completely irrelevant to the remaining material (which dealt with operant conditioning), which was the actual lesson on which all children were tested. Additionally, the first two passages were timed so children in both conditions would begin the actual lesson at the same time.

Our results showed that when children were confronted with confusion in the very early stages of the learning session, children who attributed their failures to insufficient effort performed significantly better than the children who attributed their failures to less controllable factors. That is, consistent with other research, attributing one's failures to insufficient effort appeared to be more adaptive than attributing one's failures to less controllable factors. However, when the material was presented without the confusing section at the start of the lesson, there were virtually no performance differences between children showing different attribution patterns. Thus, these results demonstrated that those beliefs which are generally considered maladadaptive will not debilitate performance in certain classroom learning situations. As we will see later, the beliefs that are most maladaptive in one learning condition may even be facilitative under some circumstances. This study also presented a clear demonstration that individual differences in beliefs can lead to individual differences in performance that are unrelated to children's actual ability. The differential performance of children with different attributions (i.e., in the

confusion condition) was not due to different levels of ability, as evidence by the fact that children with different attributions performed equally well in the no-confusion condition.

In another study (Licht, Kistner, Ozkaragoz, Shapiro, & Clausen, 1985), a related finding emerged. Here, we employed an attributional measure which allowed us to more precisely assess children's causal explanations for their academic failures. This measure yielded three scores indicating the degree to which the child attributed his/her failures to 1) insufficient effort, 2) insufficient ability, and 3) external factors (the teacher, the task). A second difference between these two studies was that the first study was conducted in a classroom setting, whereas in the second study, the context was novel (i.e, children were tested individually in a research trailer), and their teacher was not present. Although the academic task was also novel, it clearly involved reading ability. The children were presented with a stack of 30 index cards. On each card, a sentence was printed, which contained two nonsense words and 5-10 words that were within the reading level of all children. This format insured that all children would experience both failure (i.e., words they could not read) and success (words they did know) on each sentence, regardless of their actual reading ability. Each child was told to read aloud as many sentences as he/she chose; and our dependent measure was the degree to which they persisted at the task.

In view of the fact that the ability area was reading, we predicted that children who attributed their reading failures to

insufficient ability would show poor persistence on this task. However, a different prediction was made for children who attributed their reading difficulties to external factors, even though there is evidence that attributing one's failure to external factors (e.g., blaming the teacher or the task) is generally less adaptive than attributing one's failures to one's own efforts (Crandall, Katkovsky, & Preston, 1962; Crandall & Lacey, 1972). Although the belief that others are to blame for your difficulties should not lead to increased effort as readily as the belief that your difficulties are due to insufficient effort, it has been suggested that children who blame the teacher or the task for their difficulties may be able to maintain confidence in their abilities. Thus, they may respond with renewed optimism when both the situation and the evaluating adult are novel. Thus, in the experimental situation employed, we expected that children who tended to blame external factors for their difficulties would NOT show low persistence. Our predictions were confirmed. Although the tendency to blame one's ability was negatively related to persistence, the tendency to blame external factors was not.

In another study, we examined a different type of belief--namely, how children define "intelligence". Some recent research has shown that there are both developmental differences and individual differences in how children define intelligence (Dweck & Elliott, 1983; Nicholls & Miller, 1984). At one end of the continuum are those who define intelligence as a relatively stable capacity or "entity" that limits the utility of one's efforts. This "entity" view is most characteristic of older

children and adults. At the other end of the continuum are those who believe that intelligence is something that continually increases as one learns new material. This has been referred to as the "incremental" view (Dweck & Elliott, 1983), and it is most characteristic of younger children. For children with the "incremental" view, trying hard and learning new skills are often equated with "getting smarter."

Some recent research has also focused on the implications that these different definitions have for persistence and performance on intellectual tasks (Dweck & Elliott, 1983; Nicholls & Miller, 1984). It has been found that children who view intelligence as a stable capacity are more likely to avoid situations that involve the risk of making mistakes and are more likely to show a deterioration of performance in the face of failure than are children who view intelligence as less stable. Presumably, this is because situations that might lead you to conclude that your ability is low, such as making mistakes, should have more devastating implications if you view your ability as stable than if you view your ability as capable of increasing with effort.

In a study conducted by one of my students (Sexton, Licht, Brown, & Linden, 1984), we replicated the finding that children who view intelligence as stable are more prone to debilitation in the face of failure than are children who view intelligence as changeable through their efforts. However, there was an interesting surprise that is relevant to the main theme of this paper. In this study, the performance measure was a

discrimination-learning task. The task consisted of six training problems which, as the name implies, were used to train the children how to solve the problems. These were followed by four test problems which were similar to those used in training, but they were insoluble. We could monitor the sophistication of children's problem-solving strategies over the course of the four test problems to determine the degree to which their performance improved, stayed the same, or deteriorated in the face of failure.

As indicated, we found that children who held the "entity" view of intelligence were significantly more likely to show a deterioration in performance than were children who held the "incremental" view. What is pertinant to the main theme of this paper is the unexpected finding that PRIOR to the failure problems, children who held the "entity" view performed significantly BETTER than children with the "incremental" view. It should be noted here that the "entity" and "incremental" groups were matched on IQ, age, and sex. Thus, it is highly unlikely that the initiallly superior performance of the "entity" group or the greater deterioration of the "entity" group in the face of failure was due to differences between the "entity" and "incremental" groups in actual intellectual ability. Presumably, the initially superior performance of children with the "entity" view was because children who view intelligence as stable are more motivated to avoid failure. Thus, while the belief that one's ability is stable and beyond one's control leads a child to be more vulnerable in the face of failure, this same belief may lead to heightened persistence and performance in those learning

situations where failure is more avoidable.

Implications for understanding sex differences in achievement behaviors:

I would now like to propose that this "interactional" analysis may help explain some of the sex differences that we find in the achievement behaviors of children and adults. It is suggested that the achievement-related beliefs that are characteristic of girls may make certain academic areas more enjoyable and facilitative of performance than other areas; whereas the beliefs that are characteristic of boys may make different academic areas more enjoyable and facilitative of performance. (This is not to suggest that sex differences in these beliefs are the only cause of sex differences in achievement behaviors; however, I am suggesting that they are one important causative factor.) To understand this analysis, I will briefly characterize the sex differences in beliefs that have been found.

In general, girls are less confident than boys in their ability to succeed on challenging intellectual tasks. For example, when children are presented with new tasks, girls tend to show lower expectations of success than do boys (VC. Crandall, 1969; Parsons & Ruble, 1977). In addition, girls are more likely than boys to attribute their failures to insufficient ability (Dweck, Goetz, & Strauss, 1980; Parsons, Meece, Adler, & Kaczala, 1982; Nicholls, 1979), and they are less likely than boys to attribute their successes to high ability (Nicholls, 1980; Wolleat, Pedro, Becker, & Fennema, 1980). Although these sex

differences in confidence are fairly consistent, they do not emerge in all intellectual-achievement situations. Girls' lower confidence is most apparent when there is some uncertainty of success, as, for example, when tasks are unfamiliar or difficult, or when previous feedback for task performance was ambiguous[1] (V.C. Crandall, 1969; Lenney, 1977; Parsons, et al., 1982).

Recently, my students and I have attempted to examine whether sex differences in confidence are more likely to emerge in certain academic areas as a function of how the characteristics of the areas interact with children's beliefs. Different academic areas should differ in the degree to which feedback is ambiguous, and the degree to which confronting confusion and failure feedback is likely, etc. And these differences should make certain academic areas more attractive and facilitative for girls than other academic areas.

In an earlier study of children in late elementary school (Licht & Shapiro, 1984), we used children's causal attributions as an index of how much confidence they had in their abilities; and we assessed their causal attributions separately for each of the academic areas to which they were exposed. These were: reading, language arts, math, social studies, and science. We did not find sex differences in the attributions children made for reading, language, or math. We did, however, find significant sex differences for both social studies and science. For both social studies and science, girls were significantly more likely than boys to attribute their failures to insufficient ability, and they were significantly less likely than boys to attribute

their successes to high ability. These sex differences in confidence occurred despite the fact that there were no significant sex differences in their social studies or science grades. (Of course, the implication of this analysis is that, over time, sex differences in confidence should eventually lead to sex differences in social studies and science achievement. For example, girls lower confidence could lead to more anxiety, or less effort, or more avoidance of these areas.)

Our post hoc explanation of these sex differences was that in the elementary school years, social studies and science differ from math, reading, and language arts on two dimensions that are relevant to the beliefs of girls versus boys. First, informal discussions with the children's teachers suggested that there were far fewer assignments for social studies and science, compared to math, reading, and language arts. Thus, the less frequent feedback in social studies and science should have made success less predictable (i.e., more uncertain). A second factor that may have created more uncertainty about one's abilities in social studies and science is that for these two areas, over 50% of the children received only pass/fail grades. Thus, even children who consistently passed these subjects could not be certain their performance was commendable.

In a more recent study (Licht, Stader, Swenson, & Kaiser, 1987) of elementary school children (which employed different measures of confidence), we replicated these findings. That is, girls were less confident than boys about their abilities in social studies and science, but there were no sex differences in confidence for reading, language arts, or math. (There were no

sex differences in the actual grades that these children received in ANY of these areas.) In this study, we also asked children to rate each of the subject areas in terms of some of the dimensions that we felt might be mediating the sex differences in confidence. The children's responses were generally consistent with our post hoc analysis of the Licht & Shapiro findings. Both boys and girls felt that there were the fewest number of assignments in social studies and science, with the most being in math. To a lesser degree, they also felt that the teacher gave the least amount of feedback for their performances in social studies and science, and that the reasons for the grades they received were most ambiguous for social studies and science. The most frequent feedback and the least ambiguous grades were for math. (Perhaps this pattern of giving assignments and feedback reflects the "back to basics" movement which is likely to stress basic reading and math drills over social studies and science.) Thus, social studies and science seemed to be taught in such a way as to lessen the already shakey confidence of girls.

The implication of this analysis is NOT that sex differences in confidence should emerge regularly in social studies and science more than in reading, language arts, or math. Rather, the implication is that certain beliefs are going to be facilitative of performance in certain kinds of learning situations but not in others--even though the children holding these beliefs may possess the ability to perform equally well in these different areas. At certain ages (i.e., late elementary school) and at certain points in history (e.g., when there is a stress on basic

math and reading skills), we will find that the way in which social studies and science are taught may fit least well with the beliefs of girls. However, when one advances to the later school years, one might very well make different predictions. For example, it has been argued (Dweck & Licht, 1980; Licht & Dweck, 1983) that during junior high and high school, mathematics is more likely than reading and language arts to possess characteristics that increase the uncertainty of future success (e.g., new units and courses in math often begin with entirely novel and confusing concepts). Consistent with this, some studies by other researchers (Fennema & Sherman, 1977; Heller & Parsons, 1981) have found that in junior high and high school, girls are less confident than are boys in their math abilities. Furthermore, while no one has yet demonstrated directly that girls' lower confidence causes them to perform more poorly than boys on mathematics and science achievment tests (in junior high and high school) or causes them to pursue careers in mathematics and science less often than boys, this is certainly an important possibility that requires further study.

Implications for future research and educational practice:

When research suggests that certain beliefs are maladaptive, the implications for educational practice are fairly clear. The implication is that we should develop and evaluate strategies for altering these maladaptive beliefs. Of course, this is more easily said than done; but at least the general direction is clear--to eradicate maladaptive beliefs and build more desireable ones. In contrast, when research suggests that certain beliefs

may be maladaptive and debilitating in certain situations, but neutral or even facilitative in others, the implications for education practice are less apparent.

At first, I found it tempting to argue that since any belief might prove to be adaptive (or at least not maladaptive) in certain situations, we should not make any conscious attempt to alter the beliefs that the children might develop "naturally." The problem with this argument is that teachers, parents, and counselors/psychologists are all part of the child's "natural" environment; and they all undoubtedly contribute to the beliefs that children "naturally" develop. Thus, the argument that we should not try to alter children's beliefs would actually mean that we would continue to influence children's beliefs in unintentional and unsystematic ways rather than trying to systematically create environments for the children's benefit.

A second weakness of the argument that we should not intentionally try to alter children's beliefs is that while the data clearly demonstrate that the adaptiveness of particular beliefs varies as a function of the learning situation, the point of this paper is NOT that all beliefs will prove to be equally adaptive in the long run. Certain beliefs may prove to be adaptive in a larger number of situations than other beliefs, and, therefore, in the long run, will provide children with a wider array of career options. Similarly, certain beliefs may be adaptive in those achievement situations which society values and rewards most, whereas other beliefs may prove to be adaptive primarily in those achievement situations which society does not value and reward. These possibilities make our task harder, and

suggest that future research should address both the cross-situational implications of children's beliefs as well as the longer-term implications of their beliefs.

To speculate about some of these implications, consider the sex differences discussed earlier. It was argued that girls' lesser (or shakier) confidence in their intellectual abilities is likely to emerge in those situations where success is most uncertain. Thus, girls' lesser confidence should be most debilitating to their performance in very challenging situations, which should occur more frequently as children advance through the later school years, particularly in areas like math. This argument appears fairly consistent with the sex differences in achievement that have been found. When girls show lower achievement than boys, it is primarily on standardized math or science achievement tests, as opposed to course grades (see Benbow & Stanley, 1980; 1982); and these sex differences do not emerge until junior high. Additionally, the most striking sex differences (favoring boys) are reported when children are administered extremely difficult exams--for example, in studies of mathematically gifted children when junior high school children are administered college entrance level tests (SAT-Math) (Benbow & Stanley, 1980; 1982).

As suggested, this pattern of sex differences in achievement does appear consistent with the notion that girls' beliefs should be most debilitating when success is viewed as uncertain. Undoubtedly, success on timed, standardized tests is more uncertain than success in the classroom. For example, classroom

exams should be far less likely than standardized tests to contain items that are very novel. Also, classroom tests are rarely administered with strict time limits.

In contrast to the most challenging test situations, girls' beliefs should have different implications for the more typical academic settings. I am proposing that girls' lesser (or shakier) confidence may lead them to intensify their efforts as much as possible in order to avoid failure in the first place. It is this intensified effort that may lead girls to get somewhat better grades in the elementary school years (Dweck, Goetz, & Strauss, 1980) and to be viewed by elementary school teachers as harder workers and better learners (Stevenson, Hale, Klein, & Miller, 1968). This intensified effort may also be why in the later years, we rarely find sex differences in course grades for math and science. Perhaps girls "overlearn" the assigned material in order to compensate for the anxiety they expect to experience during testing. Girls may eventually drop out of more advanced math courses due to the fear that they can not keep their efforts up forever (see also Eccles, 1985, pp. 271).

The implication of the above analysis is that in the elementary school years, many of the children who appear to hold the most adaptive beliefs, and therefore, be the children about whom the teacher is least concerned, may actually hold beliefs that will, in the long-run, lead them to avoid some challenging career options. As suggested earlier, it would be necessary to follow children longitudinally to determine the long-term implications of different beliefs.

Due to space limitations and to the focus of my own

research, the above speculations have dealt exclusively with the short versus long-term implications of girls' shakey confidence in their abilities. I do not wish to suggest that the greater confidence that is more characteristic of boys will, in the long run, always prove to be adaptive. For example, some very confident children may close off career options by being overly confident and failing to exert enough effort in the early school years to master some very basic academic skills. As with the beliefs most characteristic of girls, such speculations must be verified with both cross-situational and longitudinal studies.

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Footnote

It may be helpful to note that girls' "lesser confidence" does not mean that girls tend to view themselves as extremely low in ability. For example, bright girls tend to think they are bright. However, they seem unsure or insecure about their self-evaluation. I would make a different prediction for children who actually believed they were extremely low in ability.